SHTEYNS, K.A.

Perturbation of the motion of comets by stars. Astron.zhur. 33 no.5:756-760 S-O '56. (MLRA 9:12)

1. Astronomicheskaya observatoriya Latviyskogo gosudarstvennogo universiteta.

(Comets) (Perturbation) (Stars)

AUTHOR: Shteyns, K. A.

TITLE: The distribution of comets of Jupiter's Family. (Raspredeleniye komet gruppy yupitera).

PERIODICAL: Astronomicheskii Zhurnal, 1957, Vol.34, No.1, pp.86-96 (USSR).

ABSTRACT: The existence of short-period coments, the aphelions of which are situated near Jupiter's orbit, shows the latter planet plays an important part in the origin of these, and perhaps also of other short-period comets. The researches of a number of workers (ref.1) have shown that some properties of the comets of Jupiter's family suggest that these comets originated in a number of long-period comets as a consequence of capture by Jupiter. The problem is discussed in refs.(1) - (3).

In the present paper the distribution of comets of Jupiter's family is studied, taking into account the distribution of orbits of parabolic comets, the life-time of short-period comets, and the probability of discovery of short period comets. The problem is regarded as "plane" in the first part of the paper. The three dimensional problem is taken up (in less detail in the second part).

It is assumed that a stationary swarm of parabolic comets rotates about the Sun (Refs. (3) and (4) ). The perturbation due to Jupiter has the effect of turning the parabolic comets of the swarm into short-period comets. It is considered that Jupiter moves round the Sun in a circle of radius $R_0$ and

possesses a sphere of influence of radius $\rho$ which is such that $\rho / R_o \approx 0.06$.

Using a generally accepted method, a two dimensional formula for the distribution of semi-major axes and parameters of the orbits of the comets captured by Jupiter, is derived. It is supposed that the probability of discovery of short and long period comets is the same, as determined empirically. Observations show that the distribution of perihelions of long-period comets is proportional to the distance of the perihelions from the sun.

The influence of the disintegration of comets is investigated following the work of S. V. Orlov (6) and B. Yu. Levin (7), and the gravitational hypothesis. The results are in a good agreement with observations. The almost complete absence of short-period comets with retrograde motions is a result of the fact that these comets, in most cases, have small perihelion distances and disintegrate rapidly, or in a lesser degree that they are transformed from a comparatively small number of long-period comets, which have small perihelion distances. 2 figures, 3 tables. Nine references, eight of which are Russian.

Astronomical Observatory of the
Latvian State University.

Recd. July 19, 1956.

Translation from: Referativnyy Zhurnal Fizika, 1959, Nr 5, p 280 (USSR)

AUTHOR: Shteyns, K.A.

TITLE: On Calculating Spectral Line Wavelength From Hartmann's Formula

PERIODICAL: Uch. zap. Latv. un-t, 1958, Vol 20, pp 193 - 194 (Lat. résumé)

ABSTRACT: The spectral line wavelength $\lambda$ and the corresponding length s on the photographic plate are connected as follows by Hartmann's formula: $\lambda = \lambda_o + c \cdot (s - s_o)^{-\alpha}$, where $\lambda_o$, $s_o$, c, and $\alpha$ are constants characterizing the given spectrogram; $\alpha$ is considered to be known, while the constants $\lambda_o$, $s_o$, and c are determined by the least squares method on the basis of some pairs $\lambda_1$, $s_1$; $\lambda_2$, $s_2$; ..., $\lambda_n$, $s_n$, which are known from measurements. The approximate values of $\lambda_o$, $s_o$, and c, which are necessary in this connection, are generally determined from three known $\lambda$, s pairs by the method of successive approximation. The author proposes a simpler method of determining the approximate values of the constants. For this purpose a family of curves of the type $\lambda' = c \cdot (s)^{-}$ is first plotted for various c. Then a $\lambda$,

Card 1/2

On Cal

s curve
this cur
which c i
the $\lambda'$,

...ns of a parallel transfer of
... of the curves of the family for
...o will be the coordinates of the origin of
...system.

...-11866

88819

3.1400 (1080,1109)

S/035/61/000/002/001/016
A001/A001

Translation from: Referativnyy zhurnal, Astronomiya i Geodeziya, 1961, No. 2, p.13, # 2A153

AUTHORS: Shteyns, K. A., Sture, S.

TITLE: On One Case of Application of Matrices to Celestial Mechanics

PERIODICAL: Uch. zap. Latv. un-t, 1959, Vol. 28, pp. 141 - 143 (Latvian summary)

TEXT: The authors derive equations for conversion of Euler angles relative to the Earth's symmetry axis to Euler angles relative to the instantaneous rotation axis using matrices-krakowians. Oppolzer equations are obtained as a particular case:

$$\left\| \begin{matrix} -\omega \sin \theta_1 d \psi_1/dt \\ \omega d \theta_1/dt \\ d\omega/dt \end{matrix} \right\| = r(-\varphi) \left\| \begin{matrix} dp/dt \\ dq/dt, \\ 0 \end{matrix} \right\|$$

X

Card 1/2

88819

S/035/61/000/002/001/016
A001/A001

On One Case of Application of Matrices to Celestial Mechanics

where $\omega$ is angular velocity of Earth's rotation, $\psi_1$ is lunar-solar precession, $\theta_1$ is nutation, $\varphi$ is angle of intrinsic rotation in Oppolzer sense,

$$r(-\varphi) = \begin{Vmatrix} \cos\varphi & -\sin\varphi & 0 \\ \sin\varphi & \cos\varphi & 0 \\ 0 & 0 & 1 \end{Vmatrix} .$$

N. Yakhontova

Translator's note: This is the full translation of the original Russian abstract.

Card 2/2

SHTEYNS, K.A.; ABELE, M.K.

Expansion of the association Cepheus II [with summary in English]. Astron. zhur. 35 no.1:82-85 Ja-F '58. (MIRA 11:3)

1. Astronomicheskaya observatoriya Latviyskogo gosudarstvennogo universiteta.

(Cepheids)

SHTEYNS, K.A.

Limiting criterion for the capture of comets [with summary in English]. Astron. zhur. 35 no.1:159-160 Ja-F '58. (MIRA 11:3)

1. Astronomicheskaya observatoriya Latviyskogo gosudarstvennogo universiteta.

(Comets--Orbits)

3(1)

AUTHOR: Shteyns, K.A. SOV/33-36-3-18/29

TITLE: The Distribution of the Jovian Group of Comets

PERIODICAL: Astronomicheskiy zhurnal, 1959, Vol 36, Nr 3, pp 512-523 (USSR)

ABSTRACT: At first it is stated that the method for the determination of the distribution of the Jovian group of comets used by H.Newton /Ref 1/ as well as the method of V.G.Fesenkov /Ref 3/ yield insufficient results. Then the problem of distribution is treated anew, where the following factors are considered: distribution of the orbits of parabolic comets, the life-time of short-period comets, the probability of detection of short-period comets. For long-period comets it is assumed that the poles of the orbits, the ascending nodes, and the distances of the perihelions to the ascending nodes are distributed uniformly on the celestial sphere, while the perihelions in the space are distributed uniformly. The calculations carried out under these assumptions show a good agreement with the observations (independent of the fact whether the variant of H.Newton or that of Fesenkov is taken). In both cases there result: a) diminution of the number of comets for an increasing semiaxis a, b) concentration of the comets for a maximal $\sqrt{p}$ for a=const, c) absence of comets with a

Card 1/2

The Distribution of the Jovian Group of Comets SOV/33-36-3-18/29

retrograd motion and concentration of almost all comets in $0^\circ < i < 25^\circ$ (i - inclination of the orbit plane). The author mentions S.V.Orlov.

There are 4 figures, 1 table, and 6 references, 4 of which are Soviet, 1 English, and 1 French.

ASSOCIATION: Astronomicheskaya observatoriya Latviyskogo gos. universiteta (Astronomical Observatory of the Latvian State University)

SUBMITTED: July 17, 1958

Card 2/2

SHTEYNS, K.A. ; RIYEKSTYN'SH, E.Ya.

Diffusion of comets. Part 1. Astron.zhur. 37 no.6:1061-1067 N-D '60. (MIRA 13:12)

1. Astronomicheskaya observatoriya Latviyskogo gosudarstvennogo universiteta.

(Comets)

S/035/62/000/003/001/053
A001/A101

AUTHOR: Shteyns, K. A.

TITLE: On basic problems in the theory of comet capture

PERIODICAL: Referativnyy zhurnal, Astronomiya i Geodeziya, no. 3, 1962, 9, abstract 3A80 ("Uch. zap. Latv. un-t", 1960, v. 38, 69-84, Latvian and English summaries)

TEXT: It is a surveying report read in Tartu at the seminar on comets on July 4-6, 1960. The studies are described dealing with capture of comets by Jupiter and transforming their parabolic orbits into short-periodic ones. It is noted that, when considering the process of spread of comets over inverse semi-major axes $a^{-1}$, the rapid disintegration of long-periodic comets should be taken into account. Then in the enlarged group of Jovian comets must be 20 times as many comets as was found by A. Woerkom without disintegration taken into account, and the capture theory predicts addition of 3 comets in 100 years in agreement with the observed disintegration of comets. In conclusion, non-observability of hyperbolic comets is explained. There are 16 references.

V. Safronov

[Abstracter's note: Complete translation]

Card 1/1

S.I.T.S, K.A.

Diffusion of comets. Part 2. The stationary process. Astron. zhur. 38 no. 1:107-114 Ja-F '61. (MIRA 14:2)

1. Astronomicheskaya observatoriya Latviyskogo gosudarstvennogo universiteta.

(Comets)

39989
S/035/62/000/008/001/090
A001/A101

3,1420

AUTHORS: Shteyns, K. A., Pudane, M. P.

TITLE: Determining the average change in the inverse magnitude of major semi-axis of a comet orbit due to perturbations by planets

PERIODICAL: Referativnyy zhurnal, Astronomiya i Geodeziya, no. 8, 1962, 9, abstract 8A90 ("Uch. zap. Latv. un-t", 1961, v. 41, 103 - 106, Latvian summary)

TEXT: In the theory of diffusion of almost parabolic comets, the magnitude of the following quantity should be known:

$$D = \left[\frac{1}{2}\int_{-\infty}^{+\infty}\varphi(\delta)\delta^2 d\delta^{-1}\right] = \left[\frac{1}{2}\overline{\delta^2}\right]^{-1},$$

where $\varphi(\delta)d\delta$ is probability of changing of the major semi-axis inverse magnitude, due to planetary perturbations, by a magnitude being within the limits from $\delta$ to $\delta + d\delta$. Various authors have calculated planetary perturbations in the range v (-180°; +180°) for 16 comets. The results of these calculations corrobora-

IX

Card 1/2

SHTEYNS, K.A. [Steins, K.]; STURE, S.Ya.

Diffusion of comets. Astron.zhur. 39 no.3:506-515 My-Je '62.
(MIRA 15:5)

1. Astronomicheskaya observatoriya Latviyskogo gosudarstvennogo universiteta.

(Comets)

[illegible]

In the Astronomical Council; conferences in M[illegible] and [illegible]. Vest. AN [illegible] 35 no.10:129-130 O '65. (MIRA 18:10)

APPROVED FOR RELEASE: 07/13/2001 CIA-RDP86-00513R001550020019-8"

SHTEYNS, K.A., doktor fiziko-matem.nauk

Let us travel with a comet. Zem.i vsel. 1 no.5:17-22 S-0 '65. (MIRA 18:11)

L 00781-67 EWT(d)/EWT(l) IJP(c) GW

ACC NR: AP6026754 SOURCE CODE: UR/0197/66/000/007/0034/0038

42

B

AUTHOR: Shteyns, K. A.--Steins, K.; Zal'kalne, I. E.--Zalkalne, I.; Kaulinya, Z. P.--Kaulina, Z.

ORG: Astronomical Observatory, LGU im. P. Stuchko (Astronomicheskay observatoriya LGU)

TITLE: Chart for modeling the star movement in the environs of the sun

SOURCE: AN LatSSR. Izvestiya, no. 7, 1966, 34-38

TOPIC TAGS: star chart, conditional star, vector, relative velocity, astronomic time, parameter, Monte Carlo method, star movement

ABSTRACT: A system has been designed to simulate star movement. The stars are uniformly distributed over the surface of a sphere and move at equal time intervals and at equal rates inward into the sphere. The vectors of relative velocities are uniformly distributed in all directions. It is shown that the basic properties of the chart have already been obtained by the Monte-Carlo method for 250 conditional stars. Formulas are evloved for the intensity and density of the

Card 1/2

L 00781-67

ACC NR: AP6026754

0

stream of stars; they are in good agreement with calculations by the Monte-Carlo method for the proposed chart. The parameters of the chart were determined in accordance with the catalog of stars nearest to the Sun. Orig. art. has: 1 figure, 5 formulas, and 1 table. [Based on authors' abstract] [NT]

SUB CODE: 03/ SUBM DATE: 10Jan66/ ORIG REF: 001/ OTH REF: 003/



APPROVED FOR RELEASE: 07/13/2001 CIA-RDP86-00513R001550020019-8"

BRODSKIY, M.S., inzh.; SHTEYNSAPIR, Yu.S., elektromekhanik

Changes in the circuit for the switching in of route indicators. Avtom.telem. i sviaz' 3 no.12:28-29 D '59. (MIRA 13:4)

1. Leningrad-Baltiyskaya distantsiya signalizatsii i svyazi Oktyabr'skoy dorogi.
(Railroads--Signaling)

SHTEYNSHLEYGER, S.

The circulation of money in extended socialist production.
Vop.ekon. no.9:101-116 S '56. (MLRA 9:10)

(Banks and banking) (Money)

KATS, L.; SHTEYNSHLEYGER, S.

Some problems in issuing credits to well-managed enterprises.
Den.i kred. 14 no.5:28-32 My '56. (MLRA 9:8)
(Credit)

SHTEYNSHLEYGER, S.

"Law of money circulation" by Z.V. Atlas. Reviewed by S. Shteinshleiger. Den. i kred. 16 no.2:81-91 F '58. (MIRA 11:3)
(Money)
(Atlas, Z.V.)

MITEL'MAN, Ye.; SHTEYNSHLEYGER, S.

"Study on the development of Soviet credit" by IA. Rubinshtein. Reviewed by E.Mitel'man, S.Shteinshleiger. Den. i kred. 17 no.1:82-91 Ja '59. (MIRA 12:4)

(Credit) (Rubinshtein, IA.)

SHTEYNSHLEYGER, S.

The role of credit in Soviet money circulation. Den. i kred. 17 no.3:25-33 Mr '59. (MIRA 12:4)
(Credit) (Money)

SHTEYNSHLEYGER, S.

Some problems in the theory of credit under socialism. Den. i kred. 17 no.8:21-31 Ag '59. (MIRA 12:11)

(Credit)

SHTEYNSHLEYGER, S.

Economic nature of direct bank credit and several problems of its development in the U.S.S.R. Den.i kred. 18 no.5:14-24 My '60. (MIRA 13:5)

(Credit)

SHTEYNSHLEYGER, S.

Some problems in planning money circulation. Den.i kred. 19 no.6: 14-23 Je '61. (MIRA 14:6)

(Money)

SHTEYNSHLEYGER, S.

Currency circulation and its further consolidation. Den. i kred. 19 no.9:3-14 S '61. (MIRA 14:9)

(Money)

SHTEYNSHLEYGER, S.; SVERDLIK, Sh.

Ways to increase bank control over inefficient enterprises.
Den. i kred. 21 no.5:13-20 My '63. (MIRA 16:5)
(Banks and banking) (Industrial management)

APPROVED FOR RELEASE: 07/13/2001 CIA-RDP86-00513R001550020019-8"

IKONNIKOV, V.V., prof.; VASIL'YEV, P.G., ,and, ekon.nauk; LAVROV, V.V., prof.; RYUMIN, S.M.; KOLYCHEV, L.I., kand. ekon. nauk; SAMOYLOV, V.K.; LYSKOVICH, A.A.; KOLOMIN, Ye.V., kand. ekon. nauk; MITEL'MAN, Ye.L., kand. ekon. nauk; BEL'KINA, R.K., kand. ekon. nauk; SHTEYNSHLEYGER, S.B., kand. ekon. nauk; ROTLEYDER, A.Ya., kand. ekon. nauk; POGODIN, Yu., red.; TELEGINA, T., tekhn. red.

[Finance and credit in the U.S.S.R.] Finansy i kredit SSSR. Moskva, Izd-vo "Finansy," 1964. 447 p. (MIRA 17:3)

BUZYREV, V.M., prof.[deceased]; LABAZOV, V.I., dots.; NIKOLOTOV, S.N., dots.; SKVORTSOV, L.I., dots.; MITEL'MAN, Ye.L., dots.; SHTEYNSHLEYGER, S.B., dots.; BELKIN, S.A., prepod.; ROTLEYDER, A.Ya., dots.; USHAKOVA, L.N., prepod.; DUBNOVA, Z.K., red.

[Currency circulation and credit in the U.S.S.R.] Denezhnoe obrashchenie i kredit SSSR. Moskva, Vysshaia shkola, 1965. 458 p. (MIRA 18:8)

1. Vsesoyuznyy zaochnyy finansovo-ekonomicheskiy institut (for all except Dubnova).

SHTEYNSHLEIGER, V. B.

PA 39/49T19

USSR/Electricity
Resonators

Apr 49

"Phenomena in Electromagnetic Resonators Near Points of Coincidence of Natural Frequencies," V. B. Shteynshleyger, 4 pp

"Dok Ak Nauk SSSR" Vol LXV, No 5

States that for those positions of the plunger adjusting the resonator where the natural frequency of the wave $H_0$ in use coincides with the natural frequency of the suppressed type of wave, a marked drop is observed in quality of resonator, although at a distance from these positions, the resonance

[redacted] 39/49T19

USSR/ Electricity (Contd)

Apr 49

of the suppressed type is practically unnoticeable. Gives results of study of the reasons for this phenomena. Submitted by Acad M. A. Leontovich, 18 Feb 49.

[redacted] 39/49T19

PHASE I BOOK EXPLOITATION 591

Shteynshleyger, Vol'f Bentsionovich

Yavleniya vzaimodeystviya voln v elektromagnitnykh rezonatorakh (Phenomena of Wave Interaction in Electromagnetic Resonators) Moscow, Oborongiz, 1955. 111 p. Number of copies printed not given.

Reviewers: Neyman, M. S., Doctor of Technical Sciences, Professor, and Katsenelenbaym, B. Z., Candidate of Technical Sciences; Ed.: Lokshina, T.A.; Tech. Ed.: Zydakin, I.M.; Managing Ed.: Latynin, Ye. V.

PURPOSE: This monograph is addressed to those interested in the problem of the effect of undesirable, spurious oscillations on resonator tuning and operation.

COVERAGE: This monograph is concerned with the design and operation of round cylindrical electromagnetic resonators operating on $H_{01}$ mode oscillations. It is pointed out that this type resonator has found wide application in high-frequency radio measuring technique owing to the fact that the $H_{01}$ mode waves have a number of advantages over other types of waves. However, other types of waves can resonate in these resonators and cause interference.

Card ~~1/4~~

The present work attempts to clarify such phenomena and to find ways of correcting them, which, according to the author, has not been done before. The author advances a theory which proposes to give an approximate explanation of the parasitic phenomena observed. Experience and experiments which have contributed to the development of the theory are discussed. The basic data as presented in this book were obtained by the author in 1948-1949 and have been borrowed from his work on the subject published in 1949. The author A.A. Pistolkors, thanks Corresponding Member, AN SSSR for his criticism of individual sections of the book, and M. L. Levin, Doctor of Physics and Mathematics, Professor M. S. Neyman and B. Z. Katsenelenbaum, Candidate of Technical Sciences, for their suggestions. There are 10 Soviet sources (including 3 translations), and 2 English.

TABLE OF CONTENTS:

SOV/109-3-7-8/23

AUTHORS: Shteynshleyger, V. B., Zonnenshtral', G. A.

TITLE: The Fluctuation of Signals Produced by a Field of Random Reflectors in the Case of Moving Radar (Fluktuatsii signala ot mnozhestva sluchaynykh otrazhateley dlya dvizhushchegosya lokatora)

PERIODICAL: Radiotekhnika i elektronika, 1958, Vol III, Nr 7, pp 928-932 (USSR)

ABSTRACT: One of the causes of random noise in moving radar is due to the fact that the frequency of the signal received by the system from an elementary volume of the reflecting field differs from the frequency of the transmitted signal by the amount of the Doppler shift; this is equal to $\frac{2W}{\lambda}\cos\beta$, where W is the velocity of the radar, $\lambda$ is the wavelength, and $\beta$ is the angle between the radius vector of the elementary volume of the field and the vector $\vec{W}$. For the purpose of analysis it is assumed that $\beta$ is the relative azimuthal angle of the elementary volume (see the figure on p 929). In practice, the spectrum

Card 1/4

of the reflected signal, received by the system, can be assumed to have a white noise structure, whose frequency characteristic is determined by the square of the directional pattern of the antenna. The envelope of the video pulses (from a given distance) at the output of the detector can be expressed by:

$$U = U_o + U_H(t) \quad , \qquad (1)$$

where $U_o$ is a DC component and $U_H$ is the fluctuating voltage. The envelope at the output of the averaging circuit is expressed by Eq.(2) so that its mean square value is given by Eq.(3). This can also be written as Eq.(5), in which $\rho(T)$ is the correlation function; $T$ is the repetition frequency of the radar pulses. The correlation function of the system at the input to the detector is expressed by Eq.(6), where $\omega_o$ is the average carrier frequency and $r$ is a slowly changing function of $\tau$. $r$ can be expressed either by Eq.(7) or Eq.(9) if the radio-frequency part of the system has a rectangular or Gaussian characteristic respectively; $F_{cn}$ is the bandwidth of the Gaussian characteristic at 0.5 the maximum value while, in Eq.(7), $\Delta f$ denotes the bandwidth of the rectangular filter. If the radar is fitted with a square detector the correleation function $\rho(\tau)$ is given by Eq.(15) and the mean square fluctuation by Eq.(16), where $\Delta f$ is defined by Eq.(13); $D_r$ in Eq.(13) denotes the horizontal aperture of the antenna. On the other hand, the mean square output at the detector of the radar with a Gaussian characteristic is expressed by Eq.(17). Approximately, Eqs.(16) and (17) can be written as Eqs.(18) and (19) respectively. For a linear detector, in a system whose bandwidth is comparatively narrow, the ratio between the mean square fluctuation voltage and the mean square voltage at the output of the detector is expressed by Eq.(23). On the basis of the above analysis it is concluded that the degree of correlation between the amplitudes

SOV/109-3-7-8/23

The Fluctuation of Signals Produced by a Field of Random Reflectors in the Case of Moving Radar

of the pulse signal received from the reflecting field during various repetition periods decreases with increasing velocity of the radar and this leads to a reduction in the suppressibility of the noise. The paper contains 1 figure and 2 Soviet references.

SUBMITTED: March 8, 1957.

1. Radar signals--Analysis 2. Radar reflectors--Performance
3. Radar antennas--Analysis 4. Mathematics

Card 4/4

SHTEYNSHLEYGER V. B

Совместное заседание с секцией распространения радиоволн

А. В. Просин,
В. Ф. Губский

Некоторые вопросы теории разнесенного приема при рассеянном распространении УКВ

А. В. Просин,
Г. И. Слободянюк,
Н. П. Левшина

Экспериментальное исследование разнесенного приема при дальнем тропосферном распространении УКВ

(с 12 до 16 часов)

В. Ф. Нестерук

Об интегральном методе обнаружения импульсного сигнала на фоне шума

Н. А. Леонов

Погрешности, возникающие в аппаратуре импульсно-кодовой модуляции

9 июня
(с 18 до 22 часов)



С. М. Дьяков (Чехословакия)

Резонансные преобразования и некоторые их применения

Л. Г. Дорфман

Расчет частотных характеристик некоторых симметричных многополюсников

Л. Е. Вайман

К расчету переходных процессов при частотной модуляции.

10 июня
(с 10 до 16 часов)

Л. Л. Мясников

Атомно-лучевые радиоспектры щелочных металлов

В. Б. Штейншлейгер,
Г. С. Мисежников

Двухрезонаторные и многорезонаторные квантовые усилители.

В. М. Турнер

К вопросу об основополагающих принципах параметрического усиления электромагнитных колебаний



report submitted for the Centennial Meeting of the Scientific Technological Society of Radio Engineering and Electrical Communications im. A. S. Popov (VNORIE), Moscow, 8-12 June. 1959

KERZHENTSEVA, N.P., nauchnyy sotrudnik [translator]; ISAYENKO, Yu.M., nauchnyy sotrudnik [translator]; MERIAKRI, V.V., nauchnyy sotrudnik [translator]; SHTEYNSHLEYGER, V.B., kand.tekhn.nauk, red.; DANILOV, N.A., red.; IOVLEVA, N.A., tekhn.red.

[Low-loss wave guide transmission lines; collection of articles translated from the English] Volnovodnye linii peredachi s malymi poteriami; sbornik statei. Moskva, Izd-vo inostr.lit-ry, 1960. 478 p. (MIRA 13:6)

1. Institut radiotekhniki i elektroniki Akademii nauk SSSR (for Kerzhentseva, Isayenko, Meriakri).
(Wave guides) (Microwaves)

30535

S/109/60/005/06/011/021
E140/E163

9,4000

AUTHORS: Shteynshleyger, V.B., and Misezhnikov, G.S.

TITLE: Wave Propagation in Electric Networks Containing Negative Resistance, in Application to Travelling Wave Quantum-Mechanical Amplifiers

PERIODICAL: Radiotekhnika i elektronika, 1960, Vol 5, Nr 6, pp 962-968 (USSR)

ABSTRACT: This paper was presented in June 1959 to the A.S. Popov Society.
Quantum-mechanical (paramagnetic) travelling-wave amplifiers have extremely low noise temperature and fairly wide band (Ref 1). The presence of the paramagnetic material is in principle expressed through the introduction of a negative real resistance into each section of the waveguide system. The present article analyses such systems in terms of an equivalent filter network with negative pure resistance in each section. It is shown that in such systems the network can be matched only at a single frequency and not over a band. Assuming a reciprocal system it is demonstrated that growing waves may occur both in the passband of the

Card 1/2

20092
S/106/60/000/012/005/009
A055/A033

9,2574

AUTHOR: Shteynshleyger, V. B.

TITLE: Quantum Paramagnetic Superhigh-Frequency Amplifiers. Part I

PERIODICAL: Elektrosvyaz', 1960, No. 12, pp. 38-44

TEXT: The object of this article (or rather of the first part of it) is to acquaint the reader with the general theory underlying the operation of quantum paramagnetic amplifiers (maser amplifiers). In the introduction to the article, the very principle of such amplifiers is briefly explained, the well-known formula $\Delta E = hf$ (1) is given, and it is pointed out why the noise level is so low at radiofrequencies in these amplifiers. In the first chapter of the article, quantum transitions of paramagnetic particles to a higher or to a lower energy level under the effect of an external magnetic field are briefly explained. The definition of the Bohr magneton is given. The fact that solid-state paramagnetic crystals (and in particular ruby crystals) are used in paramagnetic amplifiers is specified. The effect of the electric field of the crystal lattice is mentioned. A diagram of the energy levels in the case of the paramagnetic ruby crystal is reproduced.

Card 1/2

20092

S/106/60/000/012/005/009
A055/A033

Quantum Paramagnetic Superhigh-Frequency Amplifiers. Part I

In the second chapter (beginning with the explanation of the Boltzmann law), the author investigates the resonance absorption of HF-energy (paramagnetic resonance absorption). The third chapter of the article contains the explanation of the principle of quantum amplification. The amplification method proposed by Basov and Prokhorov (Zh. E. T. F., vol. 28, No. 2, 1955) and by Bloembergen (Phys. Review, vol. 104, No. 2, 1956) - the so-called "three-level method", where a strong auxiliary oscillation (at the frequency corresponding to the quantum transition betwenn levels 1 and 3) is resorted to - is described, and the principal formulae used in this method are reproduced. The interaction of the electromagnetic field and of the paramagnetic substance can be obtained by placing this substance either into an electromagnetic resonator or into a waveguide, in which fields of the signal frequency and of the auxiliary oscillation frequency exist. Both the resonator-type and the waveguide-type paramagnetic amplifiers will be described in Part II of this article. There are 5 figures and 2 references, 1 Soviet and 1 non-Soviet.

SUBMITTED: June 30, 1960

Card 2/2

SHTEYNSHLEYGER, V.B. [translator]; EL'KIND, S.A. [translator]; POPOV, R.Yu., red.; DZHATIYEVA, F.Kh., tekhn. red.

[Quantum paramagnetic amplifiers] Kvantovye paramagnitnye usiliteli; sbornik statei. Moskva, Izd-vo inostr.lit-ry, 1961. 287 p. (MIRA 14:12)

(Paramagnetic amplifiers)

22209

S/106/61/000/001/005/008
A055/A033

9,2579

AUTHOR: Shteynshleyger, V. B.

TITLE: Quantum paramagnetic superhigh-frequency amplifiers. Part II

PERIODICAL: Elektrosvyaz', no. 1, 1961, 40 - 49

TEXT: This is the second part of an article, the first part of which appeared in "Elektrosvyaz'" No. 12, 1960. The general principle having been analyzed in the first part, a description is now given of several types of quantum paramagnetic amplifiers, and their noise feature is investigated. Quantum paramagnetic amplifier of the resonator type: The general layout of the electromagnetic resonator is described, and the location of the principal components is indicated. (In amplifiers of this type, the paramagnetic crystal is placed within the resonator, close to a wall, where the intensity of the magnetic lines of force is the greatest.) The equivalent circuit of the resonator is analyzed, and formulae are derived giving: 1) the negative "magnetic decrement" ($d_m$), characterizing the efficiency of the energy-radiating paramagnetic material; 2) the power amplification factor at resonance (G), and 3) the pass-band of the amplifier ($\Delta f$). The efficiency of the paramagnetic material increases when its

Card 1/4

22209

Quantum paramagnetic superhigh-frequency .... S/106/61/000/001/005/008
A055/A033

absolute temperature decreases; this is the main reason for applying liquid helium temperature in paramagnetic amplifiers. The resonator can be connected either as a two-pole or as a four-pole network; in the former case, a "ferrite circulator" is used to separate the two waves propagating along the same line. Some constructional details are given regarding the resonator and its container. Quantum paramagnetic amplifier of the waveguide-type: (with traveling wave). This amplifier-type has been designed in order to increase the band-width. The paramagnetic material is placed, in this amplifier, along the waveguide followed by the signal wave. Since it is practically impossible to obtain the waveguide length required in this case, slowing-down wave-guide systems are used. As in the case of the resonator-type amplifier, formulae are derived for the power-amplification factor (G) and for the passband ( $\Delta f$), which proves much wider than in the resonator-type amplifier (several times 10 Mc instead of several times 1 Mc), the amplification stability being likewise greater. Formulae are also given for the power emitted by the paramagnetic material and for the power of the wave propagating along the waveguide. A system to prevent the amplifier from oscillating is described. Noises in quantum amplifiers: In the estimation of the noise feature of low-noise amplifiers, it is convenient to resort to the

Card 2/4

22209

S/106/61/000/001/005/008
A055/A033

Quantum paramagnetic superhigh-frequency ...

so-called noise-temperature, which is related to the noise factor F by the expression $T_{noise} = (F - 1)T_0$, where $T_0$ is the standard absolute temperature equal to $290^{\circ}K$. General formulae are established in the last chapter of the article, giving the noise-temperature in the cases of both the waveguide-type and the resonator-type amplifiers. In these formulae, the two terms of the sum represent, respectively, noises due to the spontaneous radiation of particles which are at the higher of the two energy levels forming the quantum transition at signal frequency and noises due to the thermal radiation of the energy-absorbing component parts of the amplifier. A similar formula is given also for the whole receiver, inclusive of the quantum amplifier preceding it. For the estimation of total noises in the system (antenna included), it is necessary to add to this formula a term representing the external noises picked up by the antenna. There are 5 figures and 10 references: 2 Soviet-bloc and 8 non-Soviet-bloc. The four most recent references to English language publications read as follows: Giordmaine, Alsop, Mayer, Townes. "A maser amplifier for Radio Astronomy at X-Band". Proc. IRE, v. 47, No. 6, 1959; Maiman. "Maser behavior: temperature and concentration effect". Journal Appl. Physics, v. 31., No. 1, 1960; Maiman, Brown, Ruby maser amplifier extends range

X

Card 3/4

22209

Quantum paramagnetic superhigh-frequency ... S/106/61/000/001/005/008
A055/A033

of electronic systems tenfold". Electronics & Communications, V. 1960; Senf, "Masers for system applications". IRE Wescon Conv. Rec. part 1, aug., 1960.

SUBMITTED: June 30, 1960

Card 4/4

1055, 1158, 1163)

S/109/61/006/009/013/018
D201/D302

AUTHOR: Misezhnikov, G.S., and Shteynshleyger, V.B.

TITLE: Theory of a travelling wave quantum paramagnetic amplifier

PERIODICAL: Radiotekhnika i elektronika, v. 6, no. 9, 1961, 1545 - 1553

TEXT: In the present article, the authors present an electrodynamic method of analyzing a waveguide post-comb slow system for a solid state travelling wave amplifier. This method is stated to be free of disadvantages of the modified transmission line method; further it permits a solution to be obtained with any required degree of accuracy. It is assumed that the space above and below the comb is completely filled with a homogeneous dielectric which makes it possible to treat the system as empty, because complete filling results in a simple change of dimensions. The dispersion equation is derived from consideration of a slow system represented in Fig. 1. The wave propagates in the z direction in the plane y = 0. It

Card 1/11

is assumed that the periodicity of the system L is small compared with the wavelength $\Lambda$ in the system. This permits analysis of the field in terms of the basic space harmonic only and consideration of the comb structure as an anistropic ideally conducting plane in the x-direction (along the posts) and a non-conducting plane in the transverse direction. With the boundary conditions

$$E_{x/y=0} = 0, \tag{1}$$

$$H_{x/y=+0} = H_{x/y=-0} \tag{2}$$

and with those at the waveguide walls, the components of the electric and magnetic fields can be obtained from the expressions for the electric U and magnetic V Hertz functions

$$\begin{aligned} E_x &= -j\left(\beta\frac{\partial U}{\partial x} + k\frac{\partial V}{\partial y}\right), \\ E_y &= -j\left(\beta\frac{\partial U}{\partial y} - k\frac{\partial V}{\partial x}\right), \\ E_z &= (k^2 - \beta^2)\, U, \end{aligned} \tag{3}$$

$$H_x = -j\sqrt{\frac{\varepsilon}{\mu}}\left(\beta\frac{\partial V}{\partial x} - k\frac{\partial U}{\partial y}\right),$$
$$H_y = -j\sqrt{\frac{\varepsilon}{\mu}}\left(\beta\frac{\partial V}{\partial y} + k\frac{\partial U}{\partial x}\right), \quad (4)$$
$$H_z = \sqrt{\frac{\varepsilon}{\mu}}(k^2 - \beta^2)V,$$

where $\varepsilon$ and $\mu$ are the dielectric and magnetic permittivity of the medium; k - phase constant of the wave in free space; $\beta$ - phase constant of the wave in the medium. Functions U and V satisfy the wave equations

$$\triangle U + k^2 U = 0,$$
$$\triangle V + k^2 V = 0. \quad (5)$$

Considering regions I and II as shown in Fig. 1 the solution for U and V is obtained for partial waves which satisfies the boundary conditions and that of $E_{tg} = 0$ at the waveguide walls and for $y > 0$

28530

Theory of a travelling wave ... S/109/61/006/009/013/018
D201/D302

$$U_I = U_{01}\,\mathrm{sh}\,\beta(b-y)\sin kx + \sum_{m=1}^{\infty} U_{m1}\,\mathrm{sh}\,\gamma_{m1}x\sin\alpha_{m1}y,$$

$$V_I = U_{01}\,\mathrm{ch}\,\beta(b-y)\cos kx + \sum_{m=1}^{\infty} V_{m1}\,\mathrm{ch}\,\gamma_{m1}x\cos\alpha_{m1}y, \qquad (6)$$

is thus obtained where $\alpha_{m1} = \frac{m\pi}{b}$; $\gamma_{m1} = \sqrt{\beta^2 - k^2 + \alpha_{m1}^2}$.

The boundary condition (2) is satisfied here when

$$H_{x/y=0} = 0; \qquad (2a)$$

substituting into (2a) the expressions for $U_1$ and $V_1$

$$\sum_{m=1}^{\infty} (\beta\gamma_{m1}V_{m1} - k\alpha_{m1}U_{m1})\,\mathrm{sh}\,\gamma_{m1}x = 0 \qquad (7)$$

is obtained and after integration

Card 4/11

28530

Theory of a travelling wave ...

S/109/61/006/009/013/018
D201/D302

$$\sum_{m=1}^{\infty} (\beta\gamma_{m1}V_{m1} - k\alpha_{m1}U_{m1})(\mathrm{ch}\,\gamma_{m1}h - 1) = 0. \quad (8)$$

In region II the electric and magnetic fields can be represented as a superimposition of TE and TM modes satisfying the boundary conditions at the waveguide walls: $E_x = 0$ for $y = \pm b$; $E_y = 0$ for $x = a$; $E_2 = 0$ for $y = \pm b$ and $x = a$ or

$$U_{II} = \sum_{m=1}^{\infty} U_{m2}\,\mathrm{sh}\,\gamma_{m2}(a - x)\cos\alpha_{m2}y,$$
$$V_{II} = \sum_{m=1}^{\infty} V_{m2}\,\mathrm{ch}\,\gamma_{m2}(a - x)\sin\alpha_{m2}y, \quad (9)$$

where $\alpha_{m2} = (2m - 1)\pi/2b$; $\gamma_{m2} = \sqrt{\beta^2 - k^2 + \alpha_{m2}^2}$; $U_{m2}$ and $V_{m2}$ are the unknown amplitudes of partial waves in the region II. A system of linear homogeneous equations is obtained which has a non-trivial

Card 5/11

28530

S/109/61/006/009/013/018
D201/D302



solution when its determinant is zero, i.e.

$$\begin{vmatrix} a_1 & b_{11} \dots b_{1r} & 0 \dots 0 \\ \dots & \dots & \dots \\ a_n & b_{n1} \dots b_{nr} & 0 \dots 0 \\ c_1 & 0 \dots 0 & d_{11} \dots d_{1r} \\ \dots & \dots & \dots \\ c_n & 0 \dots 0 & d_{n1} \dots d_{nr} \\ 0 & f_1 \dots f_r & g_1 \dots g_r \end{vmatrix} = 0, \qquad (17)$$

where

$$a_n = \cos kh \int_0^b \mathrm{ch}\, \beta (b - y) \cos \alpha_{n1} y dy - A_n k \sin kh;$$

$$b_{nr} = B_{nr}\gamma_{r1} \,\mathrm{sh}\, \gamma_{r1} h + \delta_{nr} \frac{b}{2} \mathrm{ch}\, \gamma_{r1} h;$$

$$c_n = k \cos kh \int_0^b \mathrm{sh}\, \beta (b - y) \sin \alpha_{n1} y dy + C_n \sin kh;$$

$$d_{nr} = D_{nr} \,\mathrm{sh}\, \gamma_{r1} h + \delta_{nr} \frac{b}{2} \gamma_{r1} \,\mathrm{ch}\, \gamma_{r1} h;$$

$$f_r = \beta\gamma_{r1} (\mathrm{ch}\, \gamma_{r1} h - 1); \quad g_r = k\alpha_{r1} (\mathrm{ch}\, \gamma_{r1} h - 1).$$

The dispersion Eq. (17) permits dependence of $\beta$ on k to be found with any degree of accuracy, for given goemetrical dimensions of the system. The solution in zero approximation, which can be physically interpreted, may be found considering the field of the TEM wave in region I. Putting n = 0 in

$$U_{01}\left(\cos kh \int_0^b \mathrm{ch}\, \beta(b-y)\cos \alpha_{n1} y dy - A_n k \sin kh\right) + \sum_{r=1}^{\infty} V_{r1}\left(B_{nr}\gamma_{r1}\, \mathrm{sh}\, \gamma_{r1} h + \delta_{nr}\frac{b}{2}\, \mathrm{ch}\, \gamma_{r1} h\right) = 0$$

$$U_{01}\left(k \cos kh \int_0^b \mathrm{sh}\, \beta(b-y)\sin \alpha_{n1} y dy + C_n \sin kh\right) + \sum_{r=1}^{\infty} U_{r1}\left(D_{nr}\, \mathrm{sh}\, \gamma_{r1} h + \delta_{nr}\frac{b}{2}\gamma_{r1}\, \mathrm{ch}\, \gamma_{r1} h\right) = 0, \quad (12)$$

$$U_{01}\left(\cos kh\int_0^b \mathrm{ch}\,\beta(b-y)\,dy - A_0 k\sin kh\right)=0 \quad (18)$$

is obtained from which using

$$A_n = \frac{2}{b}\sum_{m=1}^{\infty}\frac{\int_0^b \mathrm{ch}\,\beta(b-y)\sin\alpha_{m2}y\,dy\int_0^b \sin\alpha_{m2}y\cos\alpha_{n1}y\,dy}{\gamma_{m2}\,\mathrm{th}\,\gamma_{m2}d} \quad (13)$$

for $A_o$

$$\frac{1}{k\,\mathrm{tg}\,kh}=\frac{2}{b}\frac{\beta}{\mathrm{th}\,\beta b}\sum_{m=1}^{\infty}\frac{1}{(\beta^2+\alpha_{m2}^2)\,\gamma_{m2}\,\mathrm{th}\,\gamma_{m2}d}. \quad (19)$$

is given. The dispersion characteristics of the delay system as determined by Eq. (19) are given in graphic form for different values of d/b, together with experimentally obtained points by De Grasse for two values of d/b (d/b = 1 and 0.33). They show good agreement. When applying the described delay structure in paramagnetic travelling wave amplifiers, the slowing of group velocity $v_g = \frac{1}{\partial\beta/\partial\omega}$ is achieved by a decrease in the pass band of the delay system which means that distance d between the posts and the narrow wall of the waveguide should be made small. The magnetic field utilization factor F can be expressed by the formula

$$F = \frac{\int_{\sigma_{\text{кр}}} |\vec{H}^* \vec{S}_{pq}|^2 d\sigma}{(\vec{S}_{pq} \vec{S}^*_{pq}) \int_{\sigma} (\vec{H} \vec{H}^*) d\sigma}, \quad (23)$$

$$\vec{S}_{pq} = \langle p | \hat{\vec{S}} | q \rangle \quad (24)$$

is the matrix element of a vector spin operator $\hat{\vec{S}}$ in the Dirou notation for quantum transition at the signal frequency between the energy levels p and q in the paramagnetic crystal. It may be seen

28630
S/109/61/006/009/013/018
D201/D302



from it that in order to increase F in the amplifying direction, transitions should be used for which

$$m_x^2 \ll m_y^2 + m_z^2.$$

The effect of directional amplification is characterized by the ratio $R = F_+/F_-$, which is called the coefficient of non-reciprocity of amplification. Within the pass band of the slow system, the quantity $\beta b$ changes from small values at its low-frequency end to $\beta b \gg 1$ at the high frequency end. Thus for a given value of $\eta$, the law of variation of F within the passband can be determined. From the analysis of graphs of F for various values of $\eta$ it can be shown that although $\beta_1$ and, consequently, the phase velocity within the region of pass-band -- in which the group velocity varies little-- may vary considerably, the factor F within these limits remains substantially constant, i.e. depends little on the phase velocity. It follows that the gain of the amplifier with the slow structure described is dependent not on the phase velocity, but on the decreased group velocity in the system. There are 4 figures and 5 re-

Card 10/11

28530

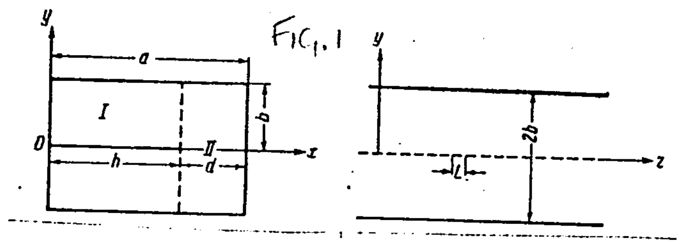
Theory of a travelling wave ... S/109/61/006/009/013/018
D201/D302

ferences: 2 Soviet-bloc and 3 non-Soviet-bloc. The references to the English-language publications read as follows: R.W. Degrasse, E.O. Schulz Du Bois, H.E.D. Scovil, Bell System Techn. J. 1959, 38, 305; E.O. Schulz-Du Bois, H.E. D. Scovil, R.W. De Grasse, Bell System Techn. J. 1959, 38, 335; J. Weber, Rev. Mod. Phys., 1959, 31, 3, 681.

SUBMITTED: February 22, 1961

Fig. 1.

FIG. 1




Card 11/11

24,7900 (1055,1144,1147)
15 2660

30085
S/048/61/025/011/031/031
B117/B102

AUTHORS: Mikhnikov, G. S., Rozenberg, Ya. I., and Shteynshleyger, V. B.

TITLE: Measurement of ferromagnetic resonance parameters in polycrystalline ferrites at liquid-helium temperatures

PERIODICAL: Akademiya nauk SSSR. Izvestiya. Seriya fizicheskaya, v. 25, no. 11, 1961, 1430-1432

TEXT: Measurement results of ferromagnetic resonance parameters in polycrystalline ferrites with high saturation magnetization at 4.2°K are given. The width $\Delta H$ of the band and the size of the external resonance field $H_{res}$ were measured. The saturation magnetization $M_o$ was determined from the $H_{res}$ values obtained by using the equation of C. Kittel (Ref. 2: see below). The block diagram of the device used for measuring the parameters is shown. The measurements were conducted at a wavelength of 3.2 cm in a cylindrical cavity (diameter 22 mm) with $H_{111}$-type oscillations. Several types of ferrites were investigated: Mg-Mn,

Card 1/2

APPROVED FOR RELEASE: 07/13/2001 CIA-RDP86-00513R001550020019-8"

ferrite П-28 (P-28) Ni-Zn ferrites M-55 (M-55), and M-258 (M-258) (Ref. 3: Fabrikov V. A., Gushchina Z. M., Kudryavtsev V. D., present periodical, no. 11, 1961, 1429). Best results were obtained with M-258 (66.38% by weight of Fe, 8.11% of ZnO, 9.93% of NiO, 7.63% of $MnCO_3$, 1.34% of MgO, 6.61% of CuO). M-55 rendered less favorable results. It was not possible to carry out quantitative measurements for P-28 since the line of ferromagnetic resonance was too much blurred, and resonance was insufficient. For M-258 samples in the form of a sphere of 0.5 mm diameter and a disk of 0.16 mm thickness and 1.7 mm diameter, the following values were ascertained: at 293°K: $H_{sphere}$ = 3015 oe, $H_{disk}$ = 1720 oe, $\Delta H$ = 120 oe, $H_a$ = 315 oe, $M_o$ = 380 gauss; at 4.2°K: $H_{sphere}$ = 2270 oe, $H_{disk}$ = 950 oe, $\Delta H$ = 800 oe, $H_a$ = 1060 oe, $M_o$ = 420 gauss. Hence, it was found that the band of ferromagnetic resonance of the polycrystalline ferrites investigated was broadened strongly at helium temperature. The minimum width of the band (800 oe) was observed in the specially produced Ni-Zn ferrite of the type M-258. The authors thank V. A. Fabrikov and A. G. Gurevich for a discussion of results. There are 1 figure, 1 table, and 3 references: 2 Soviet and

X

S/109/62/007/005/014/021
D230/D308

9,2574

AUTHORS: Shteynshleyger, V.B., Misezhnikov, G.S., and Afanasyev, O.A.

TITLE: The efficiency of various pumping methods in travelling wave quantized paramagnetic amplifiers using a ruby

PERIODICAL: Radiotekhnika i elektronika, v. 7, no. 5, 1962, 874 - 879

TEXT: Various quanta gaps can be employed in three-level solid state travelling wave masers, following the variant described by R.W. De Grasse et all (Bell Syst. Tech. J., v. 38, no. 2, 1959, 305). The authors investigate the combination of pumping action on the 1-4 level with simultaneous action of auxiliary saturated microwave fields at two frequencies corresponding to 1-3 and 3-4 levels. Formulas for the paramagnetic gain coefficient $G_{\pi}$ and inversion coefficient p in terms of the slow-wave system length, wavelength in free space, group velocity retardation, magnetic decrement and paramagnetic absorption decrement are derived and discussed. Expressions for p for the above mentioned energy levels are established.

B

Card 1/2

S/109/62/007/005/014/021
D230/D308

The efficiency of various pumping ...

The experimental verification of $p = G_{\pi}/L_{\pi}$, where $L_{\pi}$ is the paramagnetic decrement in the absence of pumping action, is described. The comb structure uses pink ruby rods, and ferrites to absorb backward waves. The results are shown in curves plotting p vs. concentration of chrome in the ruby at $2^{o}K$ and $4.2^{o}K$, for $\nu_{13}$, $\nu_{13} + \nu_{34}$ and $\nu_{14}$, plotting $G_{\pi}$ vs. chrome content for $\nu_{14}$, at these temperatures. They indicate the attraction of the $\nu_{14}$ mode of operation which is possible at $4.2^{o}K$. There are 3 figures and 1 table.

SUBMITTED: August 21, 1961

B

Card 2/2

SHTEYNSHLEYGER, V.B.

Quantum paramagnetic amplifiers with coupled cavities. Radiotekh. i elektron 7 no.7:1253-1254 '62. (MIRA 15:6)
(Microwaves) (Amplifiers (Electronics))

SHTEYNSHLEYGER, V.B., MISEZHNIKOV, G.S.

"Increase of efficiency of a traveling wave ruby maser."

Report submitted to the Third Intl. Conference on Quantum Electronics,
Paris, France 11-15 Feb 1963

APPROVED FOR RELEASE: 07/13/2001 CIA-RDP86-00513R001550020019-8"

L 16075-65 EWT(d)/EWT(l)/EEC(b)-2/EWA(h) Pn-4/Pi-4/Pj-4/Pac-4/Peb SSD/ESD(t)/ESD(c)/ESD(gs)/SSD/BSD/AFWL/ASD(a)-5/AFETR/AFTC(p)/RAEM(a)
ACCESSION NR: AP4047476 S/0120/64/000/005/0136/0138

AUTHOR: Shteynshleyger, V. B.; Afanas'yev, O. A.; Misezhnikov, G. S.; Rozenberg, Ya. I.

TITLE: Traveling-wave paramagnetic amplifier with increased efficiency

SOURCE: Pribory* i tekhnika eksperimenta, no. 5, 1964, 136-138

TOPIC TAGS: maser, paramagnetic amplifier, traveling wave paramagnetic amplifier, laser

ABSTRACT: This maser was described in part in a previous article by two of the authors. The present article gives the following characteristics of the amplifier: 1) it operates at a temperature of 4.2K, i.e., without the pumping-out of helium; 2) the delay system, which is 115 mm in length, is located in a metallic cryostat placed between the poles of the permanent magnet. Magnetization windings placed on the poles are used for accurate setting of the magnetic field intensity. Signal and pumping cryostat output waveguides are fixed on the cover of the cryostat. It was found that the highest coefficient of inversion is obtained when transition 1—4 is used for pumping. At 22 Mc the resultant paramagnetic amplification was 28 db. Noise temperature calculated on the basis of measurement data was ≈ 15K. A des-

Card 1/2

L 16075-65
ACCESSION NR: AP4047476

O

cription is also given of the ferrite isolator used in the system to eliminate regenerative effects. The isolator was made of polycrystalline nickel-zinc ferrite-chromite whose saturated magnetic field at 4.2K was 4200 oe. Orig. art. has: 1 figure.

ASSOCIATION: none

SUBMITTED: 27Jun63 ENCL: 00 SUB CODE: EC

NO REF SOV: 004 OTHER: 002

Card 2/2

APPROVED FOR RELEASE: 07/13/2001 CIA-RDP86-00513R001550020019-8"

L 17806-65 EWT(d)/EWT(l)/EEC(... )/ESD(... S/0109/64/...
ASD(a)-5/AFWL/AFETR/RAEM(a)/ESD(c)/ESD(...

ACCESSION NR: AP5000449

AUTHOR: Shteynshleyger, V. B.; Misezhnikov, G. S.

TITLE: Passband of a multiresonator quantum paramagnetic amplifier 25

SOURCE: Radiotekhnika i elektronika, v. 9, no. 12, 1964, 2099-2104

TOPIC TAGS: quantum paramagnetic amplifier, microwave amplifier

ABSTRACT: A quantum paramagnetic amplifier (QPA) represented by a multi-resonator cascade with generally nonreciprocal decoupling between the resonators is theoretically analyzed. Each resonator contains an active paramagnetic substance. Equations that describe a circuit equivalent to one resonator are set up. The passband of the cascade with a varying degree of reciprocity is analyzed. It is proven that a resonator-type QPA consisting of a cascade of resonators with an optimum nonreciprocal decoupling can provide a wider passband. In some cases, with a few resonators, the passband may come close to that of a TW QPA.

Card 1/2

L 17...65
ACCESSION NR...

L 44130-65 EEC-4/EEC(b)-2/EWG(r)/EEC(k)-2/EWG(v)/EWA(h)/EWA(k)/EWP(k)/EWT(1)/EWT(m)/EEC(t)/FBD/EWP(i)/T/EWA(m)-2/EWP(e) Pe-5/Pf-4/Pi-4/Pl-4/Pm-4/Pn-4/Po-4/Pae-2/Peb IJP(c) WH/WG/GW/WS-4

ACCESSION NR: AP5010828 UR/0020/65/161/004/0810/0812

88

AUTHOR: Matveyenko, L. I.; Misezhnikov, G. S.; Mukhina, M. M.; Shteynshleyger, V. B. 87 B

TITLE: Use of a traveling-wave maser 25 for radio astronomical 12 investigations at the 8-cm wavelength

SOURCE: AN SSSR. Doklady, v. 161, no. 4, 1965, 810-812

TOPIC TAGS: radiometer, 25 maser, traveling wave maser, radio source Signus A, radio source 3C273

ABSTRACT: The radiometer (see Fig. 1 of Enclosure) utilized during radio astronomical observations at the 8-cm wavelength in October 1963 employed a traveling-wave ruby maser with a $Cr^{3+}$ concentration of about 0.036%. Ruby crystals were located on either side of the rod delay system. Plates of an iron-yttrium polycrystalline garnet were used to absorb reflected waves; the plates were located under the ruby rods along the delay system. The delay system was mounted in the metal cryostat which ensured continuous maser operation for 8 hr without replenishing the liquid helium. The maser operated at 4.2K

Card 1/2

L 44130-65

ACCESSION NR: AP5010828

and had a gain of 20 db at a passband of 20 Mc. Maser noise temperature was less than 15K. The gain could be increased to 35 db by pumping out the helium vapor and lowering the boiling point of helium to 2K. The maser could be tuned within ±50 Mc. The use of the maser reduced radiometer noise below 15 db. The use of the circulator in front of the mixer to exclude heterodyne signals from the input and fine tuning of the modulator, antenna, and matched load reduced spurious modulation below 0.5K. Additional decoupling was not required because of the gate properties and wide band of the maser. In the entire radiometer passband, the standing wave ratic of the load was less than 1.06, and radiometer sensitivity was increased about tenfold. At a time constant of 2 sec, a radiometer without the maser recorded a radio emission flux of 540 x $10^{-26}$ $w/m^2$ cps from Signus-A; with the TW maser, recorded emission from radio source 3C273 was 30 x 10 $w/m^2$ cps. Recorded emission from Jupiter was 13.1 x $10^{-26}$ $w/m^2$ cps, corresponding to an equivalent brightness temperature of the disk of 680 ±27K. The high sensitivity of the maser was used to advantage in determining the effective dimension of Taurus-A, which was equal to 3.27 ±0.05'. Orig. art. has: 3 figures and 1 table. [DW]

Card 2/4

L 1938-66 EWT(1)/FBD GW/WS-2

ACCESSION NR: AP5018742 UR/0020/65/163/002/0332/0334

AUTHOR: Dravskikh, A. F.; Dravskikh, Z. V.; Kolbasov, V. A.; Misezhnikov, G. S.; Nikulin, D. Ye.; Shteynshleyger, V. B.

TITLE: Investigation of the radio line of excited hydrogen at 5 cm wavelength, using a quantum paramagnetic amplifier

SOURCE: AN SSSR. Doklady, v. 163, no. 2, 1965, 332-334

TOPIC TAGS: radio astronomy, galaxy, galactic nebula, line intensity, line width, hydrogen line, quantum device

ABSTRACT: Since stars are more likely to have excited hydrogen than neutral hydrogen, a study of the excited-hydrogen radio lines can yield information on the structure of the galaxy. The authors describe experiments made in 1964, which confirmed the presence of such a line, plotting its profile in the Omega nebula. This was made possible by using a traveling-wave quantum paramagnetic amplifier for 5-cm wavelength, operating at 4.2K, with gain of 25 db and bandwidth 26 Mc. The radio-spectrograph used for the observation was a modulation-type radiometer with triple frequency conversion and contour analyzer. Two measurements were made (in May and July). In the first the spectrum from the nebula was compared with the radiation spectrum of the earth's atmosphere and analyzed in the 5.5-Mc band, and in the

Card 1/2

APPROVED FOR RELEASE: 07/13/2001 CIA-RDP86-00513R001550020019-8"

16

second the comparison was with the radiation from A-Cygni and the analysis in the 3.5-Mc band. Similar results were obtained in both cases. A pronounced increase in the radiation from the nebula was observed in the 5763 Mc region. The radio-line intensity at the maximum is estimated at 3.8 ± 0.5% of the continuous spectrum, and the width at 50% intensity is 1.2 ± 0.3 Mc. The effect of the earth's rotation around the sun on the line position was also observed. "The authors thank S. E. Khaykin, Yu. N. Pariyskiy, D. V. Korol'kov, P. A. Agadshanov, Ye. A. Rozenman, V. M. Turevskiy, V. P. Kosolapov, and O. N. Shivris for useful discussions and help." This report was presented by V. A. Kotel'nikov. Orig. art. has: 4 figures.

ASSOCIATION: none

SUBMITTED: 24Dec64 ENCL: 00 SUB CODE: AA

NR REF SOV: 004 OTHER: 001

mlr
Card 2/2

ACC NR: AP6031022 SOURCE CODE: UR/0109/66/011/009/1586/1588

AUTHOR: Novostruyeva, L. I.; Stolpyanskiy, M. P.; Filatov, K. V.; Shteynshleyger, V. B.; Lifanov, P. S.

ORG: none

TITLE: A maser with a microcooler operating at 40°K

SOURCE: Radiotekhnika i elektronika, v. 11, no. 9, 1966, 1586-1588

TOPIC TAGS: maser, waveguide

ABSTRACT:

A ruby maser with a miniature closed-cycle cooler for operation at a temperature of 40°K is described (see Fig. 1). The resonator head (1) is a silver-coated ruby in the form of a parallelepiped with sapphire signal and pumping waveguides coupled to ordinary stainless-steel waveguides. The resonator is mounted between the poles of a

UDC: 621.375.8

ACC NR: AP6031022

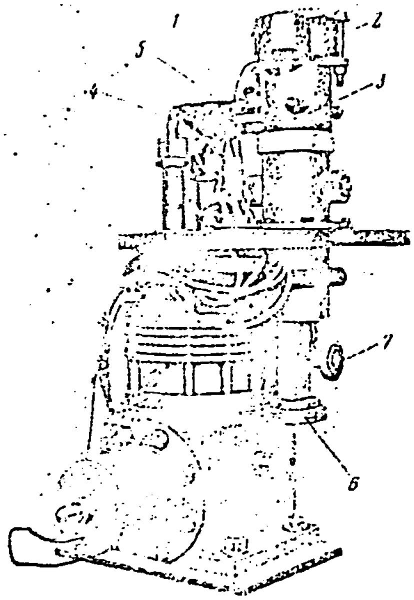



Fig. 1. Maser with microcooler

1 - Resonator head; 2 - magnet; 3 - support; 4 - microcooler cold zone tube; 5 - contact reed; 6 - air-tight flange of signal waveguide; 7 - air-tight flange of pumping waveguide.

miniature permanent magnet (2) rigidly attached to a support (3) which

Card 2/4

ACC NR: AP6031022

is maintained at normal temperature ( $\sim 300°K$). A copper reed (5) provides thermal contact between the cold zone (4) of the microcooler and the resonator head.

Total heat flux through the maser head is about 2 w at $10^{-3}$ mm Hg. By separating the resonator head from the waveguides, this heat flux is reduced to below 0.5 w.

The ruby maser was operated at the 3-cm wavelength in the push-pull mode. At a temperature of 40°K and with a chromium concentration in the ruby of 0.1% the quantity $(\sqrt{G}-1)\Delta f$ (G is the gain and $\Delta f$ is the bandwidth), which determines the bandwidth characteristic of the amplifier, reached 19 Mc.
The observed dependence of gain on temperature (see Fig. 2) indicated that, with proper chromium concentration, variations in gain caused by changes in the microcooler temperature can be considerably reduced.

The measured noise temperature of the maser did not exceed 70°K, which was in agreement with the theory. Its amplitude characteristic was linear up to an input power level of $\sim 0.15$ $\mu$w in the

Card 3/4

presence of a cw signal and up to an input energy level of 1.5 x $10^{-9}$ joule in the presence of a pulse signal of low repetition rate. No irreversible processes were observed, even in the presence of very strong pulse signals.

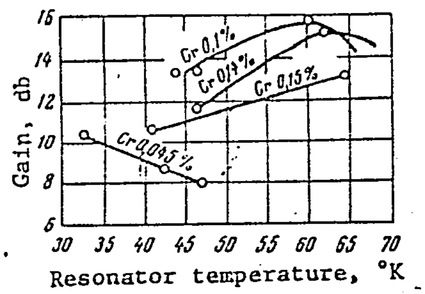



Fig. 2. Temperature dependence of maser gain

The maser was found to have a narrower transmission band and a higher noise temperature at 40° K than at liquid helium temperature. However, these disadvantages are offset by the economy and smaller size and weight of the maser. In addition, because of the relatively low noise level, high reliability, and physicochemical stability of the ruby crystal, the maser operating at 40° K can often match the performance of other types of low-noise amplifiers. Orig. art. has: 3 figures. [FSB: v. 2, no. 8]

SUB CODE: 20 / SUBM DATE: 13Jul65 / ORIG REF: 004 / OTH REF: 003



APPROVED FOR RELEASE: 07/13/2001 CIA-RDP86-00513R001550020019-8"

SHTEYNSHNAYDER, G.M.

3

5
8
9

8876* Determination of the Amount of Circulating Catalyst in the Cracking System With a Moving Pulverized Catalyst. Opredelenie kolichestva tsirkuliruiushchego katalizatora v sisteme krekinga e dvizhushchimsia poroshkoobraznym katalizatorom. (Russian.) N. M. Indiukov, M. I. Rustamov, and G. M. Shteinshnaider. *Khimiia i Tekhnologiia Topliva*, 1956, no. 4, Apr. 1956, p. 1-6.

Offers an improved method of calculating the amount of catalyst circulating in a system based on a more accurate determination of the ratio between the velocities of the gas flow and of the solid particles of the catalyst. Diagram, tables. 5 ref.

SHEVTSOV, I.S.; SAFARALIYEV, D.K.; SHTEYNSHNAYDER, G.M.; ALIYEVA, M.A.

Flameless combustion of gas in petroleum refinery tube furnaces. Azerb.neft.khoz. 39 no.9:35-38 S'60. (MIRA 13:10)
(Gas as fuel) (Furnaces) (Petroleum refineries--Equipment and supplies)

VASIL'YEV, A.A.; TKALIN, I.M.; SHTEYNSHNAYDER, M.B.

Line assembly of the movable parts of electric meters. Priborostroenie no.4:21-23 Ap '63. (MIRA 16:4)

(Assembly-line methods)

FA 161T76

USSR/Medicine - Vaccination
Tularemia

May 50

"Medical Consultations. Technique of Vaccination Against Tularemia," Prof E. Ye. Shteynshneyder, 1 p

"Fel'sher i Akusher" No 5

In reply to request by medical workers for information on technique of vaccination against tularemia, author describes B. Ya. El'berts scarification method, using N. A. Gayskiy's strain and usual reactions to subject vaccination.

[redacted]. 161T76

AID P - 3612

Subject : USSR/Engineering

Card 1/2 Pub. 28 - 3/7

Authors : Zharnenkov, P. A., B. I. Liberov, D. K. Safaraliyev and G. M. Shteynshneyder

Title : Using goudron and its high-viscosity mixture with mazut as a fuel in petroleum refineries

Periodical : Energ. byul., 10, 10-20, 1955

Abstract : Because of mazut's value as a source of light petroleum products and lubricating oils, experiments have been undertaken in using goudron and some other liquid fuel as a mazut substitute. Certain data on the experimental use of goudron as a fuel in steam boiler furnaces was published in this journal, #2, 1954. The authors of this article discuss results of the experiment in burning goudron and its high-viscosity mixture with mazut in the tubular furnace of a refinery, and make positive deductions. Furnace sketch and 3 tables showing characteristics of goudron and goudron mixtures, effects on furnace, and

AID P - 3612

Energ. byul., 10, 10-20, 1955

Card 2/2 Pub. 28 - 3/7

steam expenditures.

Institution : None

Submitted : No date

ALIYEV, Z.E.; AKHMEDZADE, A.A.; PRYANIKOV, Ye.I.; AGAMIRZOV, N.A.;
KAGRAMANOVA, F.A.; SHTEYNSHNAYDER, Ye.M.

Increasing the yield of oil, using a dewaxing installation.
Sbor. nauch.-tekh. inform. Azerb. inst. nauch.-tekh. inform.
Ser. Nefteper. i khim. prom. no.2:14-20 '62.

(MIRA 18:9)

SHTEYNTSAYG A. I.

Plevroskopicheskoe issledovanie pri seroznom plevrite. /Pleuroscopic examination in serous pleurisy/ Prob. tuberk., Moskva No. 2 Mar-Apr 51 p. 55-7.

1. Candidate Medical Sciences. 2. Sovetskaya Gavan', Khabarovsk Kray.
CMIL Vol. 20, No. 10 Oct 1951

SHTEYNTSAYG, A.I., kandidat meditsinskikh nauk (Sovetskaia gavan')

Association of pulmonary suppurations with pulmonary tuberculosis. Probl.tub. no.2:62-67 Mr-Ap '54. (MLRA 7:5)

(TUBERCULOSIS, PULMONARY, complications, *absess)
(LUNGS, abscess, *in tuberc.)
(ABSCESS, *lungs, in tuberc.)

SHPEYNTSAYG, A.I., mayor med.sluzhby; VEYSMAN, V.A., mayor med.sluzhby

Two-stage fluorography. Voen.med.zhur. no.9:75-77 S '57. (MIRA 11:3)
(FLUOROSCOPY,
2-stage (Rus)

ShTeynTsayg, A.I.

SHTEYNTSAYG, A.I.; MARGOLIS, I.M. (g.Sovetskaya Gavan', Khabarovskogo kraya)

Curing a pulmonary abscess by intrapulmonary administration of antibiotics in a two-year-seven-months-old child. Pediatriia no.9: 88-89 S '57. (MIRA 10:12)

(LUNGS--ABSCESS) (ANTIBIOTICS)

SHTEYNTSAYG, A.I., kand. med. nauk. (Leningrad)

Shortcomings of diagnosing lung diseases by fluorography; result of a retrospective study of fluorograms. Vest. rent. i rad. 33 no.6: 28-31 N-O '58. (MIRA 12:1)
(LUNG DISEASES, diag.
fluorography, disadvantages (Rus))

SHTEYNTSAYG, A.I., kand.med.nauk

Some changes in the symptomatology of acute lung abscesses in recent years. Sov.med. 23 no.1:74-77 Ja '59. (MIRA 12:2)
(LUNGS, abscess
sympt., variations (Rus))

SHTEYNTSAYG, A.I.; RABINOVICH, R.M.

Prolonged course of bronchial cancer. Terap.arkh. no.6:23-28 '61. (MIRA 15:1)

1. Iz tuberkuleznoy bol'nitsy Leningradskogo otdela zdravookhraneniya, stantsiya Razliv.

(BRONCHI--CANCER)

SHTEYNTSAYG, K.Kh., inzh.

Method of outline determination of large-size sections to their finished dimensions. Trudy NTO sud.prom. 8 no.3:87-89 '59.
(MIRA 13:5)

(Hulls (Naval architecture))

BYSTREVSKIY, L.M.; OMEL'CHENKO, V.M.; SHTEYNTSAYG, K.Kh.

Inspired work of Nosenko shipyard workers. Sudostroenie 27 no.10:14-17 O '61. (MIRA 14:12)
(Kherson--Shipbuilding)

SHTEYNTSAYG, K.Kh., inzh.

Technical conference on the mechanization of labor-consuming processes and the elimination of difficult manual labor. Sudostroenie 27 no.11:77-78 N '61. (MIRA 15:1)
(Shipbuilding--Congresses)

VASIL'YEV, Kirill Vasil'yevich; SHAPIRO, Il'ya Samuilovich;
SHTEYNTSAYG, Kalman Khaymovich; RAGAZINA, M.F., inzh.,
~~ved. red.;~~ SOROKINA, T.M., tekhn. red.

[Air-arc cutting of metals. P.A.Vachkov's method for the gas planing of steel]Vozdushno-dugovaia rezka metallov. Gazovaia strozhka stali po metodu P.A.Vachkova. Moskva, Filial Vses. in-ta nauchn. i tekhn. informatsii, 1958. 13 p. (Peredovoi nauchno-tekhnicheskii i proizvodstvennyy opyt. Tema 12. No.M-58-70/7) (MIRA 16:3)
(Electric metal cutting) (Gas welding and cutting)

121-7-7/26

AUTHOR: OBNOVLENSKIY, P.A., MUSYAKOV, L.A., SHTEYNTSAYG, M.A.

TITLE: A Photoelectron Device for the Investigation of Small Grooves and Cavities. (Fotoelektronnoye ustroystvo dlya kontrolya glubiny malykh pazov i polostey, Russian)

PERIODICAL: Stanki i Instrument, 1957, Vol 28, Nr 7, pp 19-21 (U.S.S.R.)

ABSTRACT: The double microscope of V.P.LINNIK, member of the Academy, is known to be used for the investigation of surface quality as well as for measuring unevennesses of the surface from 1 to 60$\mu$ and more. It can also be used for the investigation of grooves and cavities of a depth of up to 0,05-0,06 mm, in which case the groove must be sufficiently long, so that the beams can be reflected from the groove bottom under an angle of 45°. The use of a photoelement makes it possible to carry out measurements objectively and more rapidly. Besides, such a photoelectric device may be used for the automatic testing of various products. For the automatic determination of the amount of shift of the aperture image it is necessary, instead of the angle bisector of the microscope ocular, to use the edge of the untransparent roller blind and a photoelement. In the case of the shifting of the aperture image with respect to the edge of the roller blind, the intensity of the light current upon the

Card 1/2

121-7-7/26

A Photoelectron Device for the Investigation of Small Grooves and Cavities.

photoelement changes. In order to restore its original value, the roller blind must be shifted to the same extent as the aperture image. It is thus possible, from this shifting, to draw conclusions as to the deviations of the reflecting surface, which are proportional to one another. The derivation values of a reflecting surface can be evaluated on the basis of the change of light current intensity impining upon the photoelement; this method is, however, characterized by a number of sources of errors which are detrimental to its accuracy. With the aid of 3 illustrations the construction and the operation of such devices is then described and explained in detail. On such automatically working devices it is possible to test and to sort out workpieces with an accuracy of up to 3 $\mu$.

ASSOCIATION: Not given
PRESENTED BY:
SUBMITTED:
AVAILABLE: Library of Congress

Card 2/2

OBNOVLENSKIY, Petr Avenirovich; MUSYAKOV, Leonid Abramovich; SHTEYNTSAYG, Matvey Abramovich; KHOTILIN, Aleksandr Iosifovich; PAPAZOV, Nikolay Fedorovich; TUCHKOVA, L.K., inzh., ved. red.; SOROKINA, T.M., tekhn. red.

[Automatic control of a double microscope. Automatic device for checking rollers]Avtomatizatsiia dvoinogo mikroskopa. Avtomat dlia kontrolia valikov. Moskva, Filial Vses. in-ta nauchn. i tekhn. informatsii, 1958. 13 p. (Peredovoi nauchno-tekhnicheskiy i proizvodstvennyi opyt. Tema 21. No.M-58-140/5) (MIRA 16:3)
(Microscope) (Electronic instruments)

[illegible], A. [illegible] [illegible]: [illegible], [illegible]; [illegible], [illegible]; [illegible], [illegible]

Car Couplings

Automatic coupling for mine-shaft cars. Gor. zhur. no. [illegible], 195[illegible].

Monthly List of Russian Accessions, Library of Congress, December 1952. UNCLASSIFIED.

SHTEYNTSAG, M.B., inzhener

Mechanized exchange of cars in cages. Gor.zhur. no.3:38-42 Mr '55.
(Krivoy Rog--Hoisting machinery) (MLRA 8:7)